J Enzyme Inhib Med Chem. 2005 Aug;20(4):393-9.

The inhibition effect of some n-alkyl dithiocarbamates on mushroom tyrosinase.

Gheibi N[1], Saboury AA, Mansuri-Torshizi H, Haghbeen K, Moosavi-Movahedi AA.

Author information

1 Institute of Biochemistry and Biophysics, University of Tehran, Tehran, Iran.

Abstract

Three new n-alkyl dithiocarbamate compounds, as sodium salts, C4H9NHCS2Na (I), C6H13NHCS2Na (II) and C8H17NHCS2Na (III), were synthesized and examined for inhibition of both cresolase and catecholase activities of mushroom tyrosinase (MT) from a commercial source of Agaricus bisporus in 10 mM phosphate buffer pH 6.8, at 293K using UV spectrophotometry. Caffeic acid and p-coumaric acid were used as natural substrates for the enzyme for the catecholase and cresolase reactions, respectively. Lineweaver-Burk plots showed different patterns of mixed and competitive inhibition for catecholase and cresolase reactions, respectively. These new synthetic compounds can be classified as potent inhibitors of MT due to Ki values of 0.8, 1.0 and 1.8 microM for cresolase inhibitory activity, and also 9.4, 14.5 and 28.1 microM for catecholase inhibitory activity for I, II and III, respectively. They showed a greater potency in the inhibitory effect towards the cresolase activity of MT. Both substrate and inhibitor can be bound to the enzyme with negative cooperativity between the binding sites (alpha > 1) and this negative cooperativity increases with increasing length of the aliphatic tail in these compounds. The inhibition mechanism is presumably related to the chelating of the binuclear coppers at the active site and the different Ki values may be related to different interaction of the aliphatic chains of I, II and III with the hydrophobic pocket in the active site of the enzyme.

PMID: 16206836 DOI: 10.1080/14756360500179903

[Indexed for MEDLINE]